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The experience of multiple life stressors is associated with high levels of internalizing and externalizing symptoms in children and adolescents. A risk and resilience perspective suggests that sibling warmth can act as a protective-stabilizing factor, and, conversely, that sibling conflict can act as a vulnerable-reactive factor during life stress, and the present study examined whether sibling relationship qualities moderated the link between life stress and maladjustment in a sample of 210 children aged 9-18 (*M* =11.50 years old, *SD*= 2.12) from 105 families. This study also took into account the match between the type of stressor experienced (family-wide, personal, and sibling stress), and the type of protective and vulnerability effects that sibling relationship qualities can provide. Children reported on life stress, sibling warmth, conflict, and internalizing and externalizing symptoms. Mothers reported on their negative life events and each child's internalizing and externalizing symptoms. Multiple regression models were used to examine interrelations among sibling relationships qualities, life stress, and sex in the prediction of internalizing and externalizing symptoms. Results indicated that sibling warmth was a protective-stabilizing factor in the prediction of internalizing symptoms during family-wide, but not during personal and sibling stress. Sibling conflict was a vulnerable-reactive factor in the prediction of externalizing symptoms during family-wide, but not during personal and sibling stress. Results highlight the importance of contextualizing protective and vulnerability effects of sibling relationships by taking into account domains of life stress.

LIFE STRESS, SIBLING RELATIONSHIP QUALITIES, AND YOUTH ADJUSTMENT

by

Evelyn C. Blane

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Approved by

_____
Committee Chair

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair Lilly Shanahan

Committee Members Susan Calkins

Arthur Anastopoulos

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CHAPTER I

INTRODUCTION

Links between the experience of life events and an increased risk for emotional difficulties and internalizing symptoms in children and adolescents are well established (Compas, 1987; Sterling, Cowen, Weissberg, Lotyczewski, & Bike, 1985). Similarly, life events have been linked with externalizing symptoms, although somewhat less consistently (e.g., Kim, Conger, Elder & Lorenz, 2003; Jackson & Warren, 2000 in support, see Holmes, Yu, & Frentz, 1999; Malcarne, Hamilton, Ingram, & Taylor, 2000 for exceptions). These associations are typically moderate in size, indicating that not all children who experience stress from life events develop adjustment problems (Compas, 1987; Luthar & Zigler, 1991; Siddique & D'Arcy, 1984). Which factors in the family can protect children from the maladjustment associated with life stress? And in turn, which factors can increase children's vulnerability to life stress?

The sibling relationship is often an individual's longest-lasting relationship, and is characterized by both positive and negative aspects (Brody, 1998). The quality of the sibling relationship is also associated with youth's internalizing and externalizing symptoms (Brody, 1998; Buhrmester & Furman, 1990), and may serve as a protective or vulnerability factor in the face of life stress. Examining how the quality of this relationship is associated with outcomes during times of life stress can assist mental

health professionals in deciding how to best incorporate family members other than parents as sources of social support during hard times, or under which family circumstances to intervene. This literature review will first describe life stress, and examine how the risk and resilience perspective can benefit the study of life stress, sibling relationships, and maladjustment. Second, findings on protective-stabilizing and vulnerable-reactive effects of parent-child- and sibling relationships from specific high-risk contexts will be reviewed. Third, substantive and methodological contributions of the current study will be discussed. The literature review concludes with four hypotheses regarding life stress, sibling relationship qualities, and maladjustment.

Life Stress

The experience of life stress is a common risk factor in childhood. Indeed, children typically experience several negative life events simultaneously or within a short period of time (Forehand, Biggar, & Kotchick, 1997); as many as 4-7 negative events within a twelve-month period (Dubow, Edwards, & Ippolito, 1997; Larson & Ham, 1993). For example, a parent's divorce may be followed by moving home, changing schools, and remarriage by one or both parents. The influence of any single event may be small, but an accumulation of events place a stress burden on the child that can overwhelm his or her psychological resources, resulting in maladjustment (Compas, 1987; Grant, Compas, Stuhlmacher, Thurm, McMahon, & Halpert, 2003).Life events have been classified in different ways, including normative (i.e., events that commonly happen at certain points in development such as getting braces) and nonnormative events

(i.e., events that do not commonly happen such as major injury/illness); positive (i.e. events that are demanding, but are welcomed by the individual, such as a promotion at work) and negative events (i.e., events that have negative implications for the child and their family members such as school suspension, substantial loss of income). Overall, life stress resulting from negative events has the most negative implications for adjustment (Swearingen & Cohen, 1985; Vinokur & Selzer, 1975).

These negative events can originate from different sources (or domains), which have rarely been considered in the literature (see Ge, Natsuaki, Neiderhiser, & Reiss, 2009 for an exception). Considering the source, or type, of stress could further illuminate how stress impacts maladjustment, and, in turn, how children can be protected from the impact of life stress from negative events. From a family systems perspective (Minuchin, 1985), it would be useful to distinguish among family-wide, children's personal, and siblings' personal events (henceforth referred to as sibling events). Family-wide events are typically shared by the family, and thus may impact the entire family system. Often times these are events directly experienced by a parent (e.g., parental separation, loss of job, loss of a family member) and indirectly impact the well-being of children in the family. Personal events are experienced by the child personally, but do not necessarily affect the rest of the family directly (e.g., break up with boy/girlfriend, a personal injury, or having to repeat a school grade). Sibling events are personal events that happen to a child's sibling, and that may or may not affect the rest of the family, including the child. This classification helps specify where in the family stressors originate from, and, in turn,

who in the family may provide the best support for lessening the stressor burden associated with life stress.

Risk and Resilience Perspective

A risk and resilience perspective suggests that children's characteristics, aspects of their families, and attributes of their wider social environments (e.g., schools and neighborhoods) can protect children from adverse outcomes, or, in turn, increase their vulnerability to risk (e.g., Masten, 2007; Luthar & Zigler, 1991; Luthar, Cicchetti, & Becker, 2000). Statistically speaking, these factors are moderators that can weaken or strengthen the association between life stress and maladjustment (Baron & Kenny, 1996). Luthar and colleagues (2000) developed a typology of risk and protective factors, and, in this study, the focus is on protective-stabilizing and vulnerable-reactive factors. Protective-stabilizing factors reduce the strength of the association between risk and negative outcomes (Luthar et al., 2000; see Figure 1a for an illustration). For example, if a positive family relationship is present then the link between life stress and maladjustment would be decreased. Vulnerable-reactive factors, on the other hand, increase the strength of the association between risk and negative outcomes (Luthar et al., 2000; see Figure 1b). For example, if a negative family relationship is present, the link between life stress and maladjustment would be particularly strong. Two aspects of familial relationships, warmth and conflict, will now be discussed as potential protective-stabilizing and vulnerable-reactive factors.

Warmth and Conflict of Family Relationships During Life Stress

Investigations of adult and child interpersonal behaviors with close others consistently identify the dimensions of warmth and conflict of importance in relationships (Furman & Buhrmester, 1985). Warmth and conflict do not represent opposite ends of the same spectrum, but rather are two independent factors reflecting positive and negative aspects of relationships. Warmth can be conceptualized as affection, companionship, nurturance, intimacy and admiration between two persons. In turn, conflict broadly reflects the degree of antagonism, aggression or quarrelling between the individuals in a relationship (Furman & Burhmester, 1985).

Warm relationships during life stress are indicative of the likelihood that a child turns to a family member as a source of support. Indeed, warm relationships are associated with children's self-disclosure to parents (Davis & Franzoi, 1986) and to siblings (Howe, Aquan-Assee, Bukowski, Rinaldi, & Lehoux, 2000). Furthermore, relationships perceived as warm promote an open exchange of personal information and increase opportunities for emotional support (Howe et al., 2000; Howe et al., 2001). A warm relationship, therefore, is a resource that helps decrease the burden typically experienced in the face of life events, and that buffers individuals from maladjustment during high levels of life stress (House, Landis, & Umberson, 1988).

Conflictual relationships, on the other hand, may be indicative of added (or as hypothesized here: multiplied) risk for maladjustment during life stress. Indeed, conflictual relationships are negatively associated with children's discussions of internal

states (Howe, Petrakos, & Rinaldi, 1998) and frequency of communication (Hall, 1987), and positively associated with aggressive behaviors and conduct problems (Brody, 1998). Conflictual family relationships may give children the feeling that they cannot trust close others, and thus decrease the likelihood that the child will turn to these relationship partners as a source of emotional support (Finger, Hans, Bernstein, & Cox, 2009). Thus, conflictual relationships can multiply a child's stress burden during life stress.

The family relationship most often studied as potential protective and vulnerability factors is the parent-child relationship. Adolescents experiencing high numbers of stressful events but high warmth from mothers displayed lower levels of depressive and externalizing symptoms compared to adolescents with similar numbers of stressful events, but low maternal warmth (Ge, Natsuaki, Neiderhiser, & Reiss, 2009; Oliva, Jimenez, & Parra, 2009; Wagner, Cohen, & Brook, 1996). The link between parental warmth and low levels of maladjustment is also present for children living in other stressful circumstances, including dangerous, low income neighborhoods (Klein & Forehand, 2000; Loukas & Prelow, 2004; Murberg & Bru, 2004; Sandler, 1980).

On the other hand, conflictual parent-child relationships have been found to exacerbate the link between stressful circumstances and maladjustment. For example, financially disadvantaged urban children exhibited particularly high levels of externalizing symptoms when they also reported high levels of parent-child conflict (Kliewer & Kung, 1998; Loukas & Prelow, 2004; Wasserman, Miller, Pinner, & Jaramillo, 1996). Furthermore, children exposed to marital discord who also reported

high levels of parent-child conflict displayed higher levels of internalizing and externalizing symptoms than their counterparts without conflictual parent-child relationships (Cummings, 1994; El-Sheikh & Elmore-Staton, 2004). Taken together, parent-child relationship qualities can act as both, protective-stabilizing and as vulnerable-reactive factors in high-stress contexts.

Sibling Warmth and Conflict in Select and Chronic High-Risk Contexts

Few studies have considered sibling relationship qualities as sources of protection and vulnerability for children. Yet, over 80% of children in the United States grow up with a sibling (Eggebeen, 1992), and, in middle childhood, children spend more of their non-school hours with siblings than with their parents (McHale & Crouter, 1996). Therefore, sibling relationships may play a key role in helping children cope during times of adversity (Dunn, Slomkowski, & Beardsall, 1994) or, in turn, act as an additional stressor (Garcia, Shaw, Winslow, & Yaggi, 2000). Indeed, a few studies from specific, often chronic, high-risk contexts have shown that warm sibling relationships can be protective in the context of low peer acceptance (East & Rook, 1992), foster care placement (Linares, Oriana, Li, Shrout, Brody, & Pettit, 2007), high marital conflict (Caya & Liem, 1998; Jenkins & Smith, 1990), and divorce (Kempton, Armistead, Wierson, & Forehand, 1991; Sheehan, Darlington, Noller, & Feeney, 2004). In these circumstances, children with a warm sibling relationship exhibited less internalizing and externalizing symptoms than children without this form of support.

On the other hand, select studies from specific high-risk contexts also show that siblings can further exacerbate the stress that children are experiencing, resulting in even poorer outcomes. For example, children of divorced parents exhibited the highest levels of externalizing symptoms when they had a conflictual relationship with their sibling (Hetherington, 1993). Furthermore, children who had a conflictual sibling relationship in addition to having negative peer relationships (McElwain & Volling, 2005; East & Rook, 1992), associating with deviant peers (Snyder, Bank, & Burraston, 2005), living in foster-care (Linares et al., 2007), or having hostile, punitive parents (Garcia, Shaw, Winslow, & Yaggi, 2000) had particularly high levels of aggressive and disruptive behaviors.

Sibling Warmth and Conflict in the Context of Multiple Life Stressors

Most of the stressful circumstances discussed so far involved conditions of risk that are considered chronic, such as high marital conflict. The role of sibling relationships in adjustment has been less well studied under more acute conditions of stress. Life events are typically considered discrete or relatively short-lived, such as moving to a new house, or breaking up with a romantic partner. Nevertheless, stress associated with life events can have an impact on children's mental health similar to that of chronic stressors (Goodyer, 2001). Life events also typically do not occur in isolation and the experience of an accumulation of life events can be particularly harmful to children's mental health (Atzaba-Poria, Pike, & Deater-Deckard, 2004; Compas, 1987; Klein & Forehand, 2000; Sterling et al., 1985).

To date, only one study has examined the role of a warm sibling relationship as a possible protective-stabilizing factor in the face of stress resulting from multiple life events (Gass, Jenkins, & Dunn, 2007). In this prospective study of four- and five-year olds, children whose mothers reported high levels of life stress and whose older siblings reported low sibling warmth displayed the *most* internalizing symptoms. In turn, children with high levels of life stress and high sibling warmth had relatively low levels of internalizing symptoms. Thus, sibling warmth served as a protective-stabilizing factor for children experiencing high levels of life stress.

The study by Gass and colleagues (2007) left several questions unanswered, however. First, does sibling warmth also moderate the association between life stress and adjustment at older ages, particularly during middle childhood and adolescence? During these developmental periods, sibling relationships become more symmetrical and egalitarian compared to the younger ages (Buhrmester & Furman, 1990), and the empathic understanding of others increases (Tucker, Updegraff, McHale, & Crouter, 1999). Therefore, siblings may serve as active sources of social support for one another (Furman & Buhrmester, 1992; Howe, Aquan-Assee, Bukowski, & Lehoux, 2001). On the other hand, as children move into adolescence, they spend increasingly more time away from the home (Steinberg & Morris, 2001), and increasingly rely on social support from sources outside of the family, including best friends (Urberg, Deg¢irmenciog¢lu, Tolson, & Halliday-Scher, 1995). Indeed, during adolescence, the quality of sibling relationships typically declines (Kim, McHale, Crouter, & Osgood, 2007). Thus, an examination of

this developmental period is necessary to determine if a warm sibling relationship is still an important resource during life stress.

Second, does sibling conflict act as a vulnerability factor during high levels of life stress? Gass and colleagues' study (2007) solely focused on protective effects of sibling warmth. To date it is unclear whether the sibling relationship can also act as a vulnerability factor in the context of multiple life stressors. As discussed above, sibling conflict is associated with negative outcomes in high-risk contexts.

Third, do protective functions of warm sibling relationships, and vulnerability functions of conflictual sibling relationships vary depending on the domain (or type) of life stress? Ge and colleagues (2009) proposed that consideration of whether the "types of challenge that life events pose are matched with types of social support (Ge et al., 2009, p. 623)" informs the study of protective and vulnerability factors in important ways. In the face of family-wide life events, warm sibling relationships may be particularly protective. Children are more likely to discuss stressful family experiences such as parental divorce or a geographic move with a family member than with a friend (Gore & Aseltine, 1995). Most family-wide events originate with parental life stress, taxing parents' own well-being and their ability to provide supportive parenting (Ge, Conger, Lorenz, & Simons, 1994). Therefore siblings, whose support concerning family issues tends to be reciprocal (Tucker, McHale, & Crouter, 2001), may be the best source for interpreting and dealing with family-wide problems. Sibling conflict, on the other hand, could be particularly harmful to children during the experience of stress from family-

wide events. If stressed parents are emotionally unavailable during life stress, and siblings have hostile relations, there may be no one else to turn to for support in the nuclear family. The presence of a conflictual sibling relationship may be indicative of one less source of support for children, and represents an additional stressor in the family, one that may compound the stress burden already felt.

The match between personal events (e.g., started wearing braces or glasses) as a stressor and warm sibling relationships as a source of social support may be less ideal. Children's personal events often occur in the school environment (e.g., school suspension), or during extracurricular activities (e.g., not being accepted into an important school activity) types of experiences that siblings often do not share. Therefore, a sibling may not be aware of the stresses experienced by the child, or have too little knowledge of the stressful circumstances to offer effective support. Indeed, issues concerning interpersonal relations are more often discussed with peers than family members (Hunter, 1985). This also suggests that sibling conflict may not act as a vulnerable-reactive factor in the face of personal stress. Sibling conflict would most likely not influence the ability or availability of the child's support sources, and therefore would not increase the likelihood of poor outcomes during personal stress. That is, children may be more likely to effectively deal with stress resulting from a conflictual sibling relationship as it does not necessarily increase the child's stress burden in the personal domain.

Lastly, there may be a mismatch between type of stressor and type of support when it comes to siblings' personal life events and the quality of the sibling relationship. Children can have high levels of empathy with siblings, and may, therefore experience their siblings' life events as stressful (Updegraff & Obeidallah, 1999). Yet, when children experience a stressful event, their resources are taxed and they cannot be available to provide social support to a sibling. Thus, children with warm and low conflict sibling relationships may have particularly poor adjustment when their sibling experiences a life event. Evidence for such a mismatch between type of stressor and support comes from the peer and parent-child literatures. Females who experienced high stress in friendships rated high in support reported the highest levels of maladjustment (Gore, & Aseltine, 1995). Furthermore, children who experienced stress in the parent-child relationship exhibited better outcomes when the parent-child relationship was low in warmth (Beam, Gil-Rivas, Greenberger, & Chen, 2002). It appears that high levels of support *and* stress in a relationship act to increase children's vulnerability to those stressors. Conversely, high levels of conflict may be associated with better outcomes during life stress experienced by a close other. This is because conflict in the relationship may allow children to distance themselves from the stress that individual feels, thus reducing their own perception of the stressfulness of others' events. To date, no study has examined whether the protective and vulnerability effects of sibling relationship qualities vary by type of stressor.

Finally, an unaddressed question is whether protective-stabilizing effects of sibling warmth and vulnerable-reactive effects of sibling conflict will differ for males and

females during middle childhood and adolescence? Gass and colleagues (2007) did not find that the protective-stabilizing effect of sibling warmth was further moderated by sex in their sample of young children, but moderation by sex should be further examined in older samples. Female adolescents have a stronger relational orientation than male adolescents: Their relationships are often characterized by greater intimacy, and they place more importance on security and support in relationships (Furman & Buhrmester, 1992; Rudolph, 2002; Siddique & D'Arcy, 1984). Indeed, research has shown that warm parent-child relationships acted as protective-stabilizing factors particularly for females with respect to internalizing symptoms during high life stress (Murberg & Bru, 2004; Wagner et al., 1996; Ge, Conger, & Elder, 2001), and that females particularly benefited from a warm sibling relationship during divorce (Hetherington, 2003). However, the emphasis that females place on relationships also places them at risk when their relationship partners' experience stress. Some of the life events literature has shown that females are particularly vulnerable to negative effects of life events that affect people in their social network (Leadbeater, Blatt, & Quinlan, 1995). In turn, when females have siblings with whom they have a close relationship, and who experience negative life events, females may be at particular risk for maladjustment (Gore & Aseltine, 1995). Indeed, extensive discussion of problems and negative events among girls in warm relationships is associated with greater internalizing symptoms (Rose, 2002; Smetana, Campione-Barr, & Metzger, 2006). Taken together, females may particularly benefit from warm sibling relationships during family-wide events, and be particularly

vulnerable to the stress felt by a sibling's events when this relationship is characterized by high levels of warmth and low levels of conflict.

Several methodological considerations also need to be taken into account in the study of life stress, adjustment, and sibling relationship qualities. Gass and colleagues (2007) used the older sibling's report of the sibling relationship to predict younger siblings' adjustment. Previous research indicates, however, that siblings' reports of their relationship quality are only weakly or moderately correlated (Stocker & McHale, 1992). Therefore, a sibling's report of the relationship quality may not reflect a child's actual experiences, and children's self-reports of their relationship qualities should be examined. Gass and colleagues' study also used maternal reports of life stress. For older children, however, children's self-reports are more accurate indicators of their actual experiences than maternal reports are (e.g., Gonzales, Cauce, & Mason, 1996). In fact, some mothers may not be aware of stress resulting from children's personal events, such as breaking up with a boy- or girl-friend or their sibling's events. Therefore, the present study will explore whether protective and vulnerability effects of sibling relationships will vary depending on the different reporters of events and adjustment (i.e. child's report of events and symptoms vs. maternal report of events and symptoms).

The Present Study

The proposed investigation will use a risk and resilience perspective to examine sibling warmth and conflict as protective-stabilizing and vulnerable-reactive factors in the face of life stress in a sample of adolescents.

Hypothesis 1. Children who experience life stress and have a warm sibling relationship will have fewer internalizing and externalizing symptoms than children who experience life stress, but lack a warm sibling relationship. This protective-stabilizing effect will persist when controlling for negative aspects of the sibling relationship.

Hypothesis 2. Children who experience life stress and have a conflictual sibling relationship will have more internalizing and externalizing symptoms than children who experience life stress, but have a less conflictual sibling relationship. This vulnerable-reactive effect will persist when controlling for the positive aspects of the sibling relationship.

Hypothesis 3. A warm sibling relationship will protect children during family-wide stress, will not protect children from personal stress, and will be harmful for stress resulting from siblings' events. A conflictual sibling relationship will increase children's vulnerability to maladjustment during family-wide life stress, will not be harmful in the face of personal stress, and may even be protective in the face of sibling stress

Hypothesis 4. Females will particularly benefit from sibling warmth and low sibling conflict during family-wide events. Females will display higher levels of maladjustment during stress from siblings' events when they share a warm, low conflict relationship with that sibling.

CHAPTER II

METHOD

Participants

Data came from two cohorts of an ongoing longitudinal study of the social and emotional development in children at risk for disruptive behavior problems. All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Participants for one cohort (*N*= 153) were recruited at 2-years of age (2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992) completed by the mother in order to over-sample for externalizing behavior problems. Efforts were made to obtain approximately equal numbers of males and females identified as being at risk for future externalizing behaviors (externalizing T-score above 60). Participants for the other cohort (*N* = 140) were initially recruited when infants were 6-months of age (in 1998). There were no significant demographic differences between cohorts with regard to sex, t (291) = 0.12, p = 0.90, or 2-year SES, t (291) = 0.84, p = 0.40, or race, t (291) = 1.41, p = 0.16.

At the 10.5-year visit, families whose participant child had a sibling aged 9-18 were recruited for participation in the sibling component of the study. For purposes of clarity, the child originally participating in the larger ongoing longitudinal study will be referred to as the "target" child from this point on. The additional child from each family

participating will henceforth be referred to as the "sibling". Eighty-nine percent (*N* = 56) of the families eligible for the Sibling Component in cohort 2 agreed to participate. Ninety-five percent (*N* = 45) of the families eligible for the Sibling Component in cohort 3 agreed to participate. Families who chose not to participate in the Sibling Component either did not participate in the larger on-going longitudinal study at this time-point (*N* = 10), or cited difficulty in scheduling a time when both children would be available for participation (*N* = 1). Taken together, 210 children from 105 families participated in the sibling component.

The sample was racially diverse, with the highest percentage Caucasian (68.9%), followed by African-American (26.2%), and a minority indicated biracial (1.9%) or "other" (2.9%) status (Race did not add to the models over and above SES, so it was not included in the analyses presented here. However, the patterns of associations are the same when race is included in analyses). At the 10.5-year time point 81% (*N* = 81) of mothers from the Sibling Component indicated they were presently married. Five percent (*N* = 5) of mothers listed themselves as single, 9% (*N* = 9) were divorced, and 4 % (*N* = 4) indicated that they were currently separated from their spouse. Hollingshead scores (Hollingshead, 1975), which take into account education level, occupation, sex and marital status were used to estimate socioeconomic status. The 10.5-year Hollingshead scores for families participating in the Sibling Component indicate that this sample is economically diverse (*M* = 46). Target children were all 10.5 years old during participation in the Sibling Component, and were divided approximately equally into males (52%) and females (47%). Sibling's ages ranged from 9 to 18 years (*M* = 12.84,

SD = 2.26), and the age gap between siblings ranged from 0 to 8 years (*M* =2.75, *SD* = 2.26). The highest proportions of siblings were aged 12 (24%), 14 (19%), 13 (18%), and 9 (14%). All other ages individually comprised less than 10% of the overall sibling sample. Siblings were also approximately equally divided into males (52%) and females (48%). Table 1 provides descriptive statistics for demographic variables.

Procedure

Eligible families were contacted by phone and were given the opportunity to participate in the Sibling Component portion of the RIGHT-Track project, held during 10.5-year laboratory visits. The majority of families willing to participate agreed to bring the target child's sibling to the lab visit (*N* = 56); a minority brought questionnaire packets home to siblings who were old enough to complete the questionnaires on their own (*N* = 45). All target children completed the Sibling Component in the lab.

During the 10.5-year visit mothers were notified of applicable confidentiality stipulations and the voluntary nature of involvement in the Sibling Component. Consent was obtained from mothers, and assent from all children who chose to participate. Siblings were then taken to a room separate from their mother to complete their questionnaires; target children completed the Sibling Component questionnaires after completion of the other sections of the 10.5-year visit. Trained research assistants then explained the nature of the questionnaires to the children. Research assistants read the questionnaires aloud to participants aged 12 years or younger. Participants aged over 12 years old completed the questionnaires by themselves, and research assistants assisted

with any questions. Mothers completed separate questionnaires for each child in a private room. Mothers received a $30 honorarium for their participation in the sibling component, and children received a small, age-appropriate prize for their involvement in the study.

Measures

Dependent variables.

Youth report.

Internalizing symptoms were assessed using the Children's Depression Inventory (CDI; Kovacs, 1992). Children rated themselves on 26 items (1 item on suicidal ideation was dropped from the original scale). Each item consisted of three sentences (e.g., "*0. I am sad once in a while," "1. I am sad many times," "2. I am sad all the time"*). Children were asked to choose the sentence for each item that best described them over the past two weeks. This scale exhibited good internal consistency: Cronbach's alphas were .84 and .89 for siblings and target children, respectively. The summed total CDI score will be used, with higher scores indicating higher depressive symptoms. Anxiety was not measured.

Externalizing behavior was assessed through child self-report on the "Things I do" scale, which is one portion of the Risky Behavior Questionnaire. Developed for use in the NICHD Study of Early Child Care and Youth Development, this questionnaire also draws on work from Conger & Elder (1994), The Fast Track project (Slough &

McMahon, 2008) and the New Hope project (Epps & Huston, 2007). The "Things I do" portion of the scale consists of 19 questions assessing the child's involvement in a range of "risky" behaviors (e.g., skipping school. fighting, smoking, destroying property). Cronbach's alphas were .77 and .65 for siblings and target children, respectively. A sum score of risk-taking behaviors will be used here as an indication of the child's involvement in dangerous or delinquent acts. Items were rated on a 3-point scale (e.g., 0 =*Never,* 1= *Once or twice,* 2= *More than two times*).

Maternal report.

Externalizing and *internalizing symptoms* were assessed using the Child Behavior Checklist (CBCL; Achenbach, 1991), a broadband behavior rating scale suitable for ages 4-18 years, completed by the child's mother. The externalizing subscale items are indicative of aggression and delinquency (e.g., "Cruelty, bullying, or meanness to others," "Gets in many fights") and has excellent internal consistency: Cronbach's alphas were .84 and .89 for siblings and target children, respectively. The internalizing subscale items are indicative of depressive and anxious symptoms (e.g., "There is very little he/she enjoys", "Feels worthless or inferior") and has excellent internal consistency: Cronbach's alphas were .80 and .78 for sibling and target children, respectively. The CBCL exhibits test-retest reliability (.89), and discriminates between clinically referred and nonreferred children (Achenbach, 1992). Here, CBCL externalizing and internalizing T-scores will be used, because symptoms relative to the expected age-level are of interest. Items were rated on a 3-point scale (e.g., 1 = *Not true,* 2 = *Sometimes true,* 3 = *Often true*).

Independent variables.

Youth report.

Life Events were assessed using an adaptation of the Junior High Life Experiences Survey (JHLES) developed by Swearingen & Cohen (1985a). The JHLES is a valid measure of child and adolescents' life stress--its relation to psychological problems are consistent with results from studies that used other life events scales for this age range (Swearingen & Cohen, 1985a). This scale has been used in several studies of life events (for example, the Iowa Youth and Families Project; Ge, Natsuaki & Conger, 2006), and has excellent test-retest reliability (.96; Cohen, Burt, & Bjorck, 1987). For this investigation the following changes were made to the original JHLES scale. First, events evaluated as desirable in Swearingen & Cohen (1985b) were removed (e.g., "Received academic honors"). Second, several additional undesirable life events were added (e.g., "Lost good friend because of moving"). Third, family-wide events (i.e., events experienced by the whole family such as "Grandparent, aunt, uncle, or cousin died") and child-specific events (i.e., events experienced by only by the child such as "School suspension"), and sibling events (i.e., events experienced by the child's sibling that were stressful for the child, such as, "Sibling began using alcohol, or taking drugs") were asked in separate blocks. Finally, a rating scale was added to assess how stressful the experience of each life event was. These ratings follow a Likert scale, with higher numbers indicative of increasing negative impact/stressfulness (1 = *Not bad* to 4 =*Very bad*). This scale is the focus of the present study, and from it a stress score was computed

for overall life stress (i.e., the sum of all 46 items), and each domain of life stress. The family-wide score was the sum of 17 items, the personal score was the sum of 13 items, and the sibling score was the sum of 16 items.

Sibling warmth and sibling conflict were reported by the adolescents. The warmth subscale is an adaptation from Blyth, Hill, and Thiel (1982), and assesses individuals' perceptions of emotional closeness/warmth using eight items (e.g., "How much do you go to your brother/sister for advice/support?", "How important is your brother/sister to you?"). Cronbach's alphas were .85 and .76 for siblings and target children, respectively. The conflict subscale is five items gleaned from the Sibling Relationship Inventory (e.g., "How often do you tease, bug, or call your sister/brother names?", "How often do you feel mad or angry at your sister/brother"; SRI; Stocker & McHale, 1992). Cronbach's alphas were .78 and .81 for siblings and target children, respectively. Higher scores indicated more warmth and more conflict (1 = *Not at all* to 5 =*Very much*). Sum scores of warmth and conflict items were used.

Maternal report.

Life Events. Mothers reported on stressful life events with the Life Experiences Scale which was adapted for use in the current study (LES; Sarason, Johnson, & Seigel, 1978). For the purposes of the current study, the original measure was reduced from 43 to 19 questions to include items more applicable to the sample. Mothers completed the measure, indicating which events occurred to their immediate family in the past 12 months. The LES assessed stressors that are thought to have both a direct and indirect

impact on the child. Endorsed events were summed to create the mother's overall event score, and this acted as a proxy for mother's report of stress resulting from life events.

Control variables.

Additional variables that are typically associated with life stress, sibling relationships, and maladjustment were included as control variables. First, *sex* and *age* of each child were included. Second, the sibling status variables of *sibling age-gap*, *birth order*, and *sex composition of the dyad* were included. Finally, *socioeconomic status* was indicated by the children's mother, and was computed using Hollingshead scores (Hollingshead, 1975). These scores are obtained by computing a weighted average of an individual's education and employment (Hollingshead, 1975). In homes in which both parents are present, the final score is the average of the mother's and father's individual scores (Hollingshead, 1975).

CHAPTER III

RESULTS

As a first step, descriptive statistics of all study variables were examined. Next, interactions among life stress and sibling relationships were tested for the presence of protective-stabilizing and vulnerable and reactive effects (H1, H2). These associations were then examined with maternal report of events predicting youth report and maternal report of outcomes. To test hypothesis 3 parallel models were run for family-wide, personal, and sibling stress in order to examine whether sibling relationships are particularly protective (or make children particularly vulnerable) depending on the type of life stress experienced. Finally, analyses then tested whether these effects are further modified by sex (H4). Simultaneous regression analyses were conducted to test the hypotheses. This analytic strategy is preferred over a hierarchical method testing main effects and interaction terms in steps. The study of sibling relationship qualities as a moderator of the life stress experience necessitates that the last interaction term in each model is the focus here.

Prior to conducting analyses, life stress and sibling relationship quality scores were centered in order to facilitate interpretation and to reduce multicollinearity between the predictor variables (Aiken & West, 1991). Analyses were conducted simultaneously

for positive and negative aspects of the sibling relationship. Sibling relationships are characterized by both relationship qualities simultaneously, and their correlations are only moderate in size. Simultaneous analyses ensure that both aspects of the sibling relationship have been accounted for. Furthermore, this method decreases the number of required analyses in half.

H1 and H2 were tested through regression analyses of youth report of overall life stress and outcomes. In the prediction of youth-reported depressive symptoms, control variables (sex, age, age-gap, birth-order, dyad-sex, SES); sibling *warmth*, sibling *conflict*, life stress, and two- way interaction terms representing protective and vulnerability effects were tested simultaneously. Next, the same set of variables was used to predict youth-reported externalizing symptoms. Follow-up analyses then examined how these associations vary by reporter. That is, models examined the predictive power of youth stress and maternal events for maternal reports of internalizing and externalizing symptoms.

H3 was tested using the same models described for H1 and H2. That is, parallel models were run for family-wide, personal and sibling stressors to explore associations for each domain. Finally, H4 was tested through simultaneous regression analyses of two- and three-way interaction terms among sibling stress, sibling relationship qualities and sex. Each analysis testing three-way interactions will take the form of the Ordinary Least Squares Regression Equation shown below. Note that the equation does not show the control variables.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_1X_2 + \beta_5X_1X_3 + \beta_6X_2X_3 + \beta_7X_1X_2X_3 + \varepsilon_i$$

where:

Y = externalizing/internalizing symptoms

X_1= sex

X_2=sibling warmth

X_3=sibling conflict

X_4= life stress (overall, family-wide, personal, sibling)

X_5= sex*sibling relationship quality

X_6= sex*life stress

X_7= sibling relationship quality*life stress

X_8= sex*relationship quality*life stress

ε_i= random error

Both siblings' data were included in each analysis (rather than analyzing the sibling and target children separately). Specifically, for all analyses, data from both children in the family was stacked, resulting in an overall $N = 210$. However, instances of incomplete data result in analyses ranging in $N = 156$ to $N = 169$. Siblings come from the same family, thus the independence of observations assumption typically made in

multiple regression is violated because the data is clustered by family membership (e.g., Johnson & Elliot, 1998). To adjust standard errors for clustering the SVYREG procedure in Stata (Stata Corporation, 1999) was used. The SVYREG procedure was created to estimate accurate standard errors for numerous designs that involve correlated data (Graubard & Korn, 1994). The computed standard errors from the SVYREG procedure fall between the size of the standard errors when the degrees of freedom are the number of children and the size computed when the degrees of freedom are the number of families (Booth et al., 2003). After the statistical significance is adjusted for this lack of independence the results were interpreted as one normally would (Booth et al., 2003) F-statistics reported in this paper are the statistics derived from the STATA models.

Preliminary Analyses

Table 2 provides descriptive statistics for all other study variables. Skewness and kurtosis of the outcome variables were also examined. Depressive symptoms and risk-taking behavior were somewhat skewed and had relatively high kurtosis values (skewness = 2.35, kurtosis = 8.73; skewness = 2.07, kurtosis = 7.31, for depressive symptoms and risk-taking, respectively). In order to aide in interpretation, non-transformed outcomes were used in the models presented here. Analyses run predicting transformed versions of these outcomes resulted in similar patterns of associations. Interrelations between all study variables were examined (see Table 3). Youth report of overall stress was positively correlated with sibling conflict, and negatively correlated with sibling warmth. Additionally, youth report of overall stress was positively correlated

with youth report of depressive and risk-taking behaviors, and maternal report of externalizing symptoms. Additionally, maternal report of events was positively correlated with youth report of depressive symptoms and maternal report of internalizing and externalizing symptoms.

Finally, sibling conflict and sibling warmth were negatively correlated. As expected, the size of the association was moderate r (204) = -.29, $p < .001$, indicating that sibling warmth and sibling conflict are not opposite ends of same spectrum, but represent separate dimensions of the sibling relationship. Therefore, sibling warmth and sibling conflict were suitable to be included in a single analysis.

Sibling Relationship Qualities as Moderators of Life Stress

A series of regression analyses were conducted to examine the associations among life stress, sibling relationship quality, and child's internalizing symptoms and externalizing behaviors. Hypotheses 1 and 2 maintained that sibling relationship qualities would moderate the impact of life stress on behavior problems. Specifically, sibling warmth was expected to act as a protective-stabilizing factor, whereas sibling conflict was expected to act as a vulnerable and reactive factor during life stress. Centered life stress and sibling relationship variables were multiplied to create the interaction terms to test for the protective and vulnerability effects. Post-hoc analyses of significant interactions were conducted using Preacher's online tool for assessing 2 way interactions (Preacher, Curran, & Bauer, 2006). First, the regions of significance for continuous variables were identified at $\alpha = .05$. Next, conditional values were placed at 1 SD above

and 1 SD below the mean values of the variables. Simple slopes analyses were then conducted to determine whether the slope of the plotted simple regression lines were significantly different from zero. The simple slopes analysis indicated whether there was a significant difference in the association between the predictor and the dependent variables for children at high and low levels of each moderating variable (Frazier, Tix, & Barron, 2004; Aiken & West, 1991).

Overall stress.

First, protective and vulnerability effects of sibling relationship qualities during overall life stress were tested in the prediction of youth reported internalizing and externalizing symptoms (see Table 4).

Predicting youth-reported internalizing symptoms.

Sibling warmth was negatively associated with depressive symptoms, and sibling conflict, being female and overall life stress were positively associated with depressive symptoms. In addition, the interaction between sibling warmth and overall life stress in the prediction of depressive symptoms was significant (β = -0.17, $p < .05$; F (10,82) = 9.15, p = <.001 , R^2 =.48; see Figure 2). Follow-up analyses showed that the line representing youth who had high levels of sibling warmth was significantly different from zero (b = 0.22, $p < .001$). The line representing youth with low levels of sibling warmth was also significantly different from zero (b = 0.40, $p < .001$). The experience of life stress is associated with depressive symptoms when sibling warmth is low and high; but this association is weaker when sibling warmth is high. Consistent with Hypothesis 1,

sibling warmth had a protective-stabilizing effect on depressive symptoms in the face of high life stress. That is youth high in sibling warmth reported fewer depressive symptoms during life stress in comparison to children with low levels of sibling warmth.

Predicting youth-reported externalizing symptoms.

Age, sibling conflict, and overall life stress were positively associated with youth externalizing behaviors. In addition, the interaction between sibling conflict and overall life stress in the prediction of risk-taking behavior was significant (β = 0.22, $p < .01$; F (10, 81) = 6.80, $p < .001$, R^2=.45; see Figure 3). Follow-up analyses showed that the slope representing youth with high levels of sibling conflict was significantly different from zero (b = 0.14, $p < .001$), whereas the line representing youth with low levels of sibling conflict was not (b = 0.00, ns). Consistent with Hypothesis 2, sibling conflict has a vulnerable-reactive effect on risk-taking behavior in the face of high life stress. Youth experiencing stress from many life events and high levels of sibling conflict reported the most risk-taking behavior.

Predicting mother-reported outcomes with youth- reported overall life stress and mother-reported life events

Next, because the literature indicates that associations tend to vary as a function of reporter, analyses were conducted to explore associations among different reporters for stress and outcomes. Youth reports of stress were not associated with maternal report of internalizing symptoms, and interaction terms were not significant. Stress was positively associated with maternal reports of externalizing symptoms, and interaction terms were

not significant. Youth report of outcomes was not associated with maternal reports of life events, and interaction terms were not significant. Finally, variables were not associated with maternal report of internalizing symptoms, and interaction terms between sibling relationship qualities and mother's events were not significant. Maternal report of life events was negatively associated with maternal reports of externalizing symptoms. Again, interaction terms were not significant. Taken together, using maternal reports of either life events and/or youth adjustment, no protective-stabilizing or vulnerable and reactive effects of sibling relationships were identified.

Domains of stress.

H3 stated that protective and vulnerability functions of sibling relationships will vary by the domain of stress experienced. Thus, analyses were conducted to examine protective and vulnerability effects of sibling relationships for the different domains of life stress. We expected that sibling warmth would be protective in the face of family-wide stressors, not protective in the face of personal stress, and potentially harmful in the face of sibling stress. Conversely, sibling conflict was expected to act as a vulnerable-reactive factor in the face of family-wide stressors, not increase maladjustment in the face of personal stress, and potentially protective in the face of sibling stress.

Life stress resulting from family-wide events.

The interaction between sibling warmth and family-wide stress in the prediction of depressive symptoms was significant (β = -0.25, $p < .05$; F (10, 83) = 7.42, $p < .001$, R^2=.39; see Table 5 and Figure 4). Follow-up analyses showed that the slope representing

youth with high sibling warmth was not significantly different from zero (b = 0.15, *ns*). The slope representing youth with low sibling warmth was significantly different from zero (b = 0.65, p < .001). Thus, stress from family-wide events was associated with youth depressive symptoms only when the sibling relationship was characterized by low warmth, and sibling warmth is a protective-stabilizing factor in the face of stress from family-wide life events.

The interaction between sibling conflict and family-wide stress in the prediction of risky behaviors was significant (β. = 0.19, p < .01; F (10, 82) = 10.54, p <.001, R^2=.43; see Figure 5). Follow-up analyses showed that the slope representing youth with high levels of sibling conflict was significantly different from zero (b = 0.20 p < .001), whereas the slope representing youth with low levels of sibling conflict was not (b = 0.01, *ns*). Thus, youth who reported high levels of conflict in their sibling relationship while experiencing many family-wide stressors endorsed the most risk-taking behaviors, and sibling conflict acted as a vulnerable-reactive factor for stress from family-wide stress

Life stress from personal events.

Stress from personal events, being female, and sibling conflict were positively associated with depressive symptoms. Stress from personal events, age, and sibling conflict were positively associated with risk-taking behaviors. The interaction terms between personal stress and sibling warmth and sibling conflict, respectively, were non-significant.

Life stress from sibling events.

Stress from sibling events, sibling conflict, and being female were positively associated with depressive symptoms. Sibling stress, sibling conflict and age were positively associated with risk-taking behaviors. Interaction terms between sibling stress and sibling warmth and sibling stress and sibling conflict were not significant.

Taken together, our analyses that distinguished among types of stressors showed that, consistent with Hypothesis 3, sibling warmth protected youth from depressive symptoms in the face of family-wide events but not in the face of personal and sibling events. Sibling conflict was a vulnerable-reactive during family-wide life stress, but during not during personal and sibling stress.

Life stress and child's sex.

Hypothesis 4 stated that females may particularly benefit from warm sibling relationships during family-wide life stress, and may be particularly sensitive to sibling stress in warm, low conflict sibling relationships. Results showed that one significant three-way interaction emerged (see Table 6). Specifically, the association between sibling stress and sibling conflict varied by the child's sex in the prediction of depressive symptoms ($\beta = 0.23$, $p < .05$; F (13, 79) = 3.90, $p < .001$, $R^2 = .36$; see Figure 6). Follow up analyses indicated that only the slope for females low in conflict was significantly different from zero ($b = 2.02$, $p < .001$). All other slopes were non-significant. This interaction showed that females with low conflict were particularly vulnerable to

depressive symptoms during life stress resulting from siblings' personal events. No three-way interaction terms emerged in the prediction of risky behaviors.

CHAPTER IV

DISCUSSION

Youth experience a variety of negative events throughout childhood and adolescence. For some children, stress from the experience of multiple negative events is associated with high levels of internalizing and externalizing symptoms. Other children, however, are resilient, and family characteristics, including the quality of family relationships, moderate the association between life stress and maladjustment (Masten, 2007; Luthar & Zigler, 1991; Luthar, Cicchetti, & Becker, 2000). Our study showed that sibling warmth acted as a protective-stabilizing factor with respect to internalizing symptoms, and that sibling conflict acted as a vulnerable-reactive factor with respect to externalizing symptoms during life stress. Consistent with Ge and colleagues' (2009) ideas regarding the match between types of stressors and types of support, we found that the protective and vulnerability functions of sibling relationships varied depending on the domain of life stress, and that one of these effects was further moderated by the sex of the child. Considering the match between the types of life stress and sibling support results in a more nuanced picture of the role of sibling relationships during life stress.

Gass and colleagues (2007) identified sibling warmth as a protective-stabilizing factor during life stress for young children. Children in our study were between the ages

of 9 and 18, a period in life during which siblings typically rely less on each other's companionship (Burhmester & Furman, 1990), youth have increased opportunities to seek support outside the familial domain (Urberg, Deg¢irmenciog¢lu, Tolson, & Halliday-Scher, 1995), and the quality of sibling relationships declines (Kim, McHale, Crouter, & Osgood, 2007). Despite these overall mean changes in sibling relationships qualities, sibling warmth continued to play a protective role during life stress. Warm sibling relationships are typically accompanied by the sharing of confidential and personal information, giving children a sense of emotional validation (Howe et al., 2000, Howe et al., 2001); during life stress these warm relationships likely lessen children's overall stress burden. Putting together the findings from Gass and colleagues' study and from our study, it appears that the protective function of sibling warmth during life stress is a robust process across different periods of childhood and adolescence.

Similar to Gass and colleagues' study, the protective function of warm sibling relationships appeared for internalizing, but not for externalizing symptoms. Warm sibling relationships enhance a child's sense of competency and self-esteem (Shulman, 1993), and may thereby ward off negative cognitions about one's self, the world, and one's future-- thoughts that are indicative of depressive symptoms (Beck, Rush, Shaw, & Emery, 1979; Shulman, 1993). The role of sibling warmth in the development of externalizing behaviors may be twofold, however, and therefore no clear-cut protective effects of sibling warmth on these behaviors during life stress was found. On the one hand, warm relationships with a sibling who does not engage in risky behaviors may deter children from such behaviors during life stress. On the other hand, warm

relationships with a sibling who already engages in risky behaviors may enhance a child's involvement in these behavior during life stress (Bank, Burraston, & Snyder, 2004; Slomkowski, Rende, Conger, Simons, & Conger, 2001). Positive sibling relationships ought to be considered as potential resources, not only during conditions of chronic stress such as foster-care placement (Linares et al., 2007), but also during more acute life events stress. Parents and mental health workers should encourage children to develop and maintain warm relationships with siblings, because these relationships are often times an individual's longest-lasting relationship (Brody, 1998), that may have long term protective effects.

Gass and colleagues (2007) had not considered sibling conflict as a vulnerable-reactive factor in their study, but consistent with previous studies of sibling conflict during select, and often chronic risk contexts (e.g., Hetherington, 1993; McElwain & Volling, 2005; East & Rook, 1992; Snyder, Bank, & Burraston, 2005), conflict acted as a vulnerable-reactive factor during life stress in the prediction of externalizing, particularly risky behaviors. Siblings with high conflict are unlikely to confide in each other, may be hostile and combative to one another and have a lack of respect for one another (Scholte, van Leishout, & Aken, 2001). Such negative relationships serve to amplify the stress resulting from life events, and are particularly predictive of a child's involvement in risky behaviors, including delinquent acts. Indeed, as some research suggests, coercive sibling relationships in stressful contexts may be key in the onset of antisocial behaviors (e.g., Bank, Burraston, & Snyder, 2004).

Highly conflictual relationships with peers tend to dissolve over time (Furman & Buhrmester, 1985), but children cannot choose to dissolve highly conflictual sibling relationships. Therefore, even though siblings spend less time with one another during adolescence, sibling conflict remains a distinct vulnerability factor. Some attention has been given to this serious issue in the development of social skills intervention programs for siblings that teach children perspective-taking and conflict resolution skills (Kramer & Radey, 1997). Such social skills programs for siblings are uncommon, however, and parents and mental health workers need to pay close attention to the negative aspects of sibling relationships that increase children's vulnerability to externalizing symptoms during life stress.

Maternal Reports of Life Events and Youth Adjustment

In contrast to studies of younger children (Gass et al., 2007), protective and vulnerability effects of sibling relationship qualities during the experience of life stress were not found when using maternal reports of events or outcomes. It is likely that older children experience their mothers' life events differently than a young child would. Young children often fully depend on caregiving from their mothers, and thus are at great risk when mothers experience life stress. In middle childhood and adolescence, youth spend considerably less time with their parents than at the earlier ages (McHale & Crouter, 1996), and they increasingly experience life events that are unrelated to their family of origin. These youth require less care-taking from their mothers, and have alternative sources of social support inside and outside of the home; thus, interruptions in

care-taking may have less of an impact on children's maladjustment (Grant et al., 2003). Therefore, youth in middle childhood and adolescence may experience less stress as a result of a mother's experience of life events than in young childhood.

Concerning maternal reports of outcomes, the failure to find significant associations among youth report of life stress and maternal report of child outcomes is consistent with several studies examining how associations among stress and outcomes vary as a result of reporter (Bruce et al., 2006; Cohen, Burt, & Bjorck, 1987; Compas et al., 1989). It is possible that the associations found among youth's reports of stress and outcomes are a result of shared-method variance; on the other hand, youth in middle childhood and adolescence tend to be the best reporters of their own experiences. Indeed, studies of adolescents have shown that mothers and their children rarely agree on the presence and severity of internalizing symptoms (e.g., Kemper, Gerhardstein, Repper, & Kistner, 2003), a finding consistent with the lack of associations between youth and maternal reports of internalizing symptoms in our study. Similarly, the externalizing subscale of the Child Behavior Checklist contains a wide range of behaviors that mothers may not always be aware of (e.g., "lying or cheating", "cruelty to animals"). Taken together, youth appear to be the most accurate reporters of their own experiences, and, therefore, their reports of their life stress and maladjustment should be correlated.

Protective and Vulnerability Roles of Sibling Relationships Regarding Different Types of Stressors

Drawing on a match-mismatch perspective of types of stressors and social support (Ge et al., 2007), the present study also examined whether protective and vulnerability functions of sibling relationships vary by the domain (or type) of life stress. As expected, sibling warmth was a protective-stabilizing factor during family-wide life events. Family-wide stress often originates from events that happen to parents. Sibling share their parents, and appear to be an effective source of support during family-wide events given their familiarity with the issues faced, and their knowledge of the individuals involved (Tucker, McHale, & Crouter, 2001). These positive sibling relationships are a likely also a source of comfort for children when family stressors result in a chaotic or unpredictable home environment. Indeed, preventions and interventions should explore how to use siblings as confidantes for one another when adults in their family are stressed.

Sibling conflict acted as a vulnerable-reactive factor during family-wide life stress. Children who encounter negativity from their sibling (and presumably also their parents) during family-wide life stress may feel alone and angry, and act-out towards others and property. Alternatively, they make seek support from peers. However, because of the poor relationship skills learned at home, they may only be able to engage with antisocial peers, increasing their own risk for involvement in risky behavior (Bank, Burraston, & Snyder, 2004). It is also possible that sibling conflict is an indicator of the likelihood of engaging in risky behaviors and that sibling pairs reporting high levels of

conflict were involved in such delinquent behaviors together (e.g., Slomkowski, Rende, Conger, Simons, & Conger, 2001). Alternatively, the sibling conflict may also stem from one child's disapproval of the risky behaviors the sibling is involved in (Tucker et al., 2001). Regardless of the source of animosity between siblings, high levels of conflict in this relationship should be addressed, because simultaneous experience of family-wide stress and conflict increases children's stress burden and can result in risky behaviors.

Sibling warmth was not protective in the face of personal events. A child's experience of personal stress can involve cognitions about the child's ability to manage the consequences of an event (e.g., rumination about school suspension, and its potential influence on grades; Bruce, Cole, Dallaire, Jacquez, Pineda, & LaGrange, 2006), a change in the availability of adaptive resources (e.g., loss of a friend), or the individual's perceptions of the event standing as a barrier between themselves and goals (e.g., not being accepted into an important school activity, Kaplan, Robbins, & Martin, 1983). It may be that, as in other studies examining the personal stressors of adolescents, youth in this study relied on other sources of support in dealing with personal stresses (e.g., mothers and friends, Furman & Burhmester, 1985). Or, these associations may be further moderated by a third variable not accounted for here, such as whether a child's sibling has also experienced the same events in the past, making him or her an expert resource for the child. Indeed, descriptive studies of sibling relationships suggest that more experienced siblings can be sources of informational support, mentoring their sibling concerning peer and school stressors (Tucker, McHale, & Crouter, 2001). Sibling conflict did not act as a vulnerable-reactive factor during personal stress. If a child does not turn

to a sibling as a source of support during personal stress, it is unlikely that conflict in this relationship would increase the child's stress burden in a multiplicative fashion. Instead, conflictual peer relationships (or a conflictual relationship with the person typically sought out in the face of personal stress) may increase a child's vulnerability to maladjustment during stress resulting from personal life events.

Finally, sibling warmth did not protect children from maladjustment during sibling stress. If a child experiences stress as a result of a sibling's negative life events, it is likely that this sibling is also operating under the strain of their current situation, and therefore unable to provide emotional support for the child. Regarding sibling conflict, females who reported *high* levels of sibling stress and *low* levels of sibling conflict reported the highest levels of internalizing symptoms. For males, levels of sibling conflict did not moderate the association between sibling stress and adjustment. This finding is consistent with other studies showing that females exhibited the worst outcomes when in close relationships with others who were experiencing high levels of stress (Gamble & McHale, 1989; Smetana, Campione-Barr, & Metzger, 2006). Low conflict with a sibling during sibling stress may be indicative of high levels of self-disclosure, discussion of personal feelings and introspection characteristic of these relationships (Moran & Eckenrode, 1991). Indeed, studies of females' interpersonal styles point to processes of co- rumination as key in why females report higher-quality relationships in addition to higher levels of internalizing symptoms in comparison to males (Smetana, Campion-Barr, & Metzger, 2006). Socialization processes emphasize females as kin-keepers, and may leave them overly sensitive to the stress experienced by those with whom they have

positive relationships (Updegraff & Obeidallah, 1999). Gender intensification processes in adolescence may influence girl's greater sensitivity in this area, and future studies should explore when in development vulnerability to the stressors of close siblings increases in females.

Limitations

The present study had several limitations. First, it was cross-sectional. Ideally, a study on moderation effects should be longitudinal to test whether sibling relationships are protective or vulnerable for children across time. Indeed, the current study design is not informative regarding the direction of effects, and the word "prediction" was only used here in the statistical sense of predicting an outcome in a regression model, and not in the longitudinal sense of predicting outcomes over time. Indeed, it is not clear whether sibling warmth during life stress allows children to better cope with family stressors, or if well-adjusted children who are low in stress also tend to report higher sibling relationship qualities. Although this study provides only a "snap-shot" look at sibling relationship qualities during life stress, a previous longitudinal investigation of younger children has identified similar associations over time (e.g., Gass et al., 2007). Therefore, it is likely that future studies would also identify these associations longitudinally in samples of youth.

Second, our sample size was relatively small. Examinations of separate domains of stress should be undertaken with a larger pool of siblings in order to make firmer conclusions regarding differences in how sibling relationship qualities are associated with

stress from different domains. Third, only the closest-in-age sibling was recruited for the present study, because siblings are most likely to spend significant amounts of time with that sibling. It may be, however, that children have a special relationship with a much older or a younger sibling that protects them from or makes them vulnerable to life stress in unique ways. Fourth, differences in protective and vulnerability effects for the different domains were not formally tested. That is, we ran separate analyses for family-wide, personal, and sibling stress, but did not statistically test differences in protective and vulnerability effects of sibling relationships among these domains. In order to run such tests, we would have had test very complicated interaction terms, including four-way interactions, for which power with the present sample was simply too small. Future studies should aim at formally testing whether sibling relationship qualities *better* predict outcomes during family-wide stress in comparison to personal or sibling stress.

Finally, the present study did not examine the processes through which warm and conflictual sibling relationships impact children's adjustment during life stress. Future studies need to investigate what aspects of positive and negative sibling relationships appear to be driving the protective and vulnerability effects. This investigation establishes the associations among sibling relationship qualities, life stress, and adjustment; a next step is to determine what aspects of these relationships account for these associations.

Conclusions

Not all children who experience life stress are maladjusted. This investigation showed that considering the match between the type of life stress and sibling relationship

qualities results in a more nuanced picture of risk and resilience during life stress. Sibling relationship qualities are relevant during the experience of family-wide stress, but do not necessarily play a role for adjustment during personal stress. Low conflict relationships may be harmful for females when their siblings experience stress. Parents and mental health professionally should use the sibling relationship in nuanced and strategic ways to benefit for children during life stress.

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APPENDIX TABLES & FIGURES

Table 1.

Descriptive Statistics for Demographic Measures

Variable	N	%	M	SD	Minimum	Maximum
Child Gender						
Male	107	51.20				
Female	102	48.60				
Ethnicity						
African American	52	25.50				
Caucasian	142	69.60				
Mixed	4	2.00				
Other	6	2.90				
Child Age (in years)			11.50	2.12	9.00	18.00
Age gap (in years)			2.75	2.26	0.00	8.00
Hollingshead (SES)			41.70	10.20	13.50	66.00

Table 2

Descriptive Statistics for Study Variables

	N	M	SD	Min	Max
Youth Report Measures					
Sibling Conflict	204	11.70	3.50	5.00	25.00
Sibling Warmth	204	24.80	5.50	11.00	40.00
Overall Stress	204	10.55	9.67	0.00	72.00
Family-wide Stress	204	4.88	5.39	0.00	32.00
Personal Stress	204	3.32	3.62	0.00	24.00
Sibling Stress	204	2.35	2.94	0.00	20.00
Depressive Symptoms	180	7.60	6.06	2.00	45.00
Risk-Taking Behavior	181	2.83	2.55	0.00	18.00
Maternal Report Measures					
Mother's Life Events	192	1.65	1.85	0.00	7.00
CBCL Internalizing Symptoms	191	47.80	10.50	33.00	75.00
CBCL Externalizing Symptoms	191	47.23	10.30	33.00	80.00

Table 3

Zero-Order Correlation Matrix for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Sibling Warmth	--									
2. Sibling Conflict	-0.29**	--								
3. Overall Stress	-0.13	0.16*	--							
4. Maternal Overall Events	-0.07	0.02	0.40**	--						
5. Family-wide Stress	-0.10	0.14	0.88**	0.39**	--					
6. Personal Stress	-0.12	0.09	0.75**	0.20*	0.45**	--				
7. Sibling Stress	-0.09	0.08	0.72**	0.32**	0.48**	0.38**	--			
8. Internalizing (YR)	-0.30**	0.28**	0.58**	0.28**	0.46**	0.52**	0.36**	--		
9. Externalizing (YR)	-0.08	0.42**	0.34**	0.11	0.32**	0.28**	0.16**	0.28**	--	
10. Internalizing (MR)	-0.08	-0.07	0.03	0.15*	0.05	0.05	-0.06	0.10	-0.07	--
11. Externalizing (MR)	-0.14	0.19**	0.15*	0.21**	0.15*	0.13	0.05	0.16**	0.23**	0.55**

*$p < .05$; **$p < .01$ (YR) = Youth Report, (MR) = Maternal Report

Table 4

Summary of Regression Analyses for Youth-Reported Overall Events in Prediction of Youth-Reported Outcomes

Overall Stress as Predictor						
	Depressive Symptoms			Risk-taking Behavior		
Predictors	*B*	*SE B*	β	*B*	*SE B*	β
Sex	-1.94	0.71	-0.18**	0.74	0.39	0.13
Age	0.03	0.29	0.11	0.57	0.12	0.47**
Birth Order	0.41	1.15	0.09	0.61	0.37	0.12
Age Gap	0.06	0.85	0.09	0.25	0.41	-0.03
Dyad Sex	0.28	0.67	0.00	-0.19	0.32	-0.05
SES	0.01	0.03	0.01	-0.04	0.02	-0.14
Sibling Warmth	-0.18	0.08	-0.16*	0.06	0.03	0.13
Sibling Conflict	0.37	0.13	0.20**	0.32	0.06	0.41**
Life Stress	0.31	0.05	0.48**	0.07	0.02	0.26**
Warmth x LS	-0.02	0.01	-0.17*	---	---	---
Conflict x LS	---	---	---	0.02	0.01	0.22**

*$p < .05$; **$p < .01$

Table 5

Summary of Regression Analyses for Youth-Reported Family-wide Stress in Prediction of Youth-Reported Outcomes

	Family-wide Stress as Predictor					
	Depressive Symptoms			Risk-taking Behavior		
Predictors	*B*	*SE B*	β	*B*	*SE B*	β
Sex	-2.24	0.75	-0.19**	0.61	0.38	0.12
Age	0.17	0.34	0.11	0.57	0.12	0.47**
Birth Order	0.31	1.16	0.06	0.59	0.39	0.11
Age Gap	0.47	0.98	0.08	0.18	0.39	0.02
Dyad Sex	0.49	0.68	0.04	-0.18	0.31	-0.03
SES	-0.01	0.03	-0.02	-0.03	0.02	-0.13
Sibling Warmth	-0.20	0.09	-0.18*	0.06	0.03	0.13
Sibling Conflict	0.33	0.11	0.19**	0.32	0.06	0.42**
Life Stress	0.40	0.10	0.36**	0.10	0.03	0.22**
Warmth x LS	-0.05	0.02	-0.25*	---	---	---
Conflict x LS	---	---	---	0.03	0.01	0.19**

*$p < .05$; **$p < .01$

Table 6

Summary of Regression Analyses for Interaction among Sex, Sibling Conflict, and Life Stress in the Prediction of Depressive Symptoms on the Children's Depression Inventory

Sibling Stress as Predictor			
	Depressive Symptoms		
Predictors	B	SE B	β
Sex	-2.39	0.77	-0.22**
Age	0.40	0.32	0.27
Birth Order	0.27	1.22	0.11
Age Gap	0.45	1.06	-0.14
Dyad Sex	0.74	0.77	0.03
SES	-0.00	0.04	0.00
Sibling Warmth	-0.21	0.09	-0.20*
Sibling Conflict	0.42	0.20	0.22*
Life Stress	1.22	0.31	0.52**
Conflict x LS	-0.23	0.11	-0.30*
LS x Sex	-0.97	0.30	-0.30**
Conflict x Sex	-0.01	0.26	-0.01
Conflict x LS x Sex	0.23	0.10	0.23*

*$p < .05$; **$p < .01$

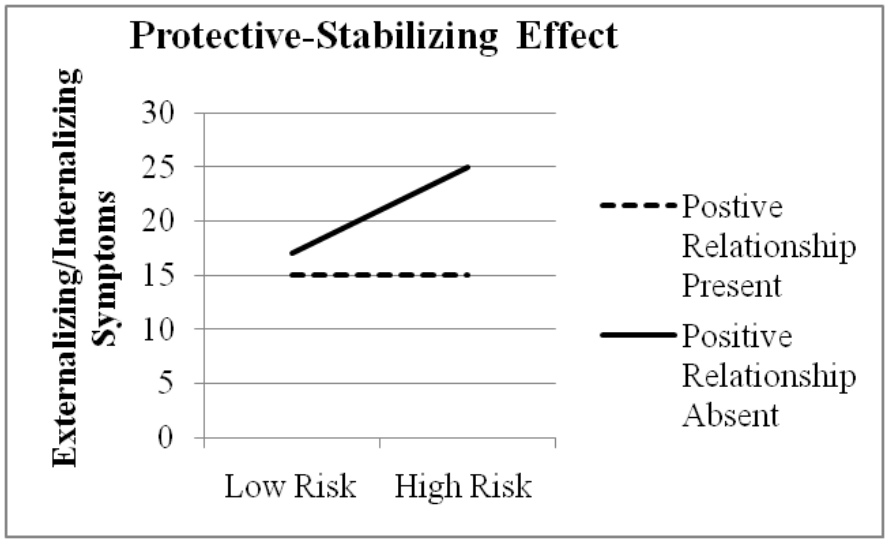

Figure 1a. Protective-Stabilizing Effect

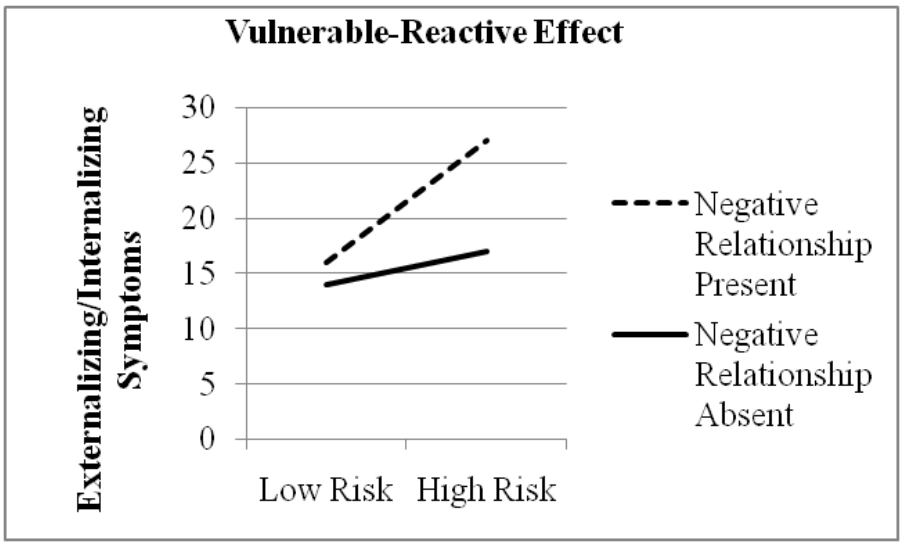

Figure 1b. Vulnerable-Reactive Effect

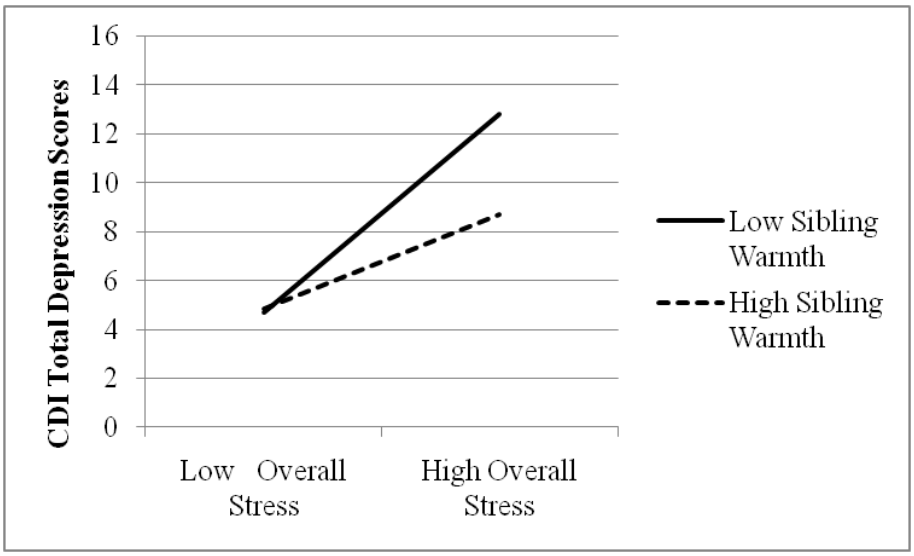

Figure 2. Interaction of sibling warmth and youth-reported overall stress in predicting depressive symptoms

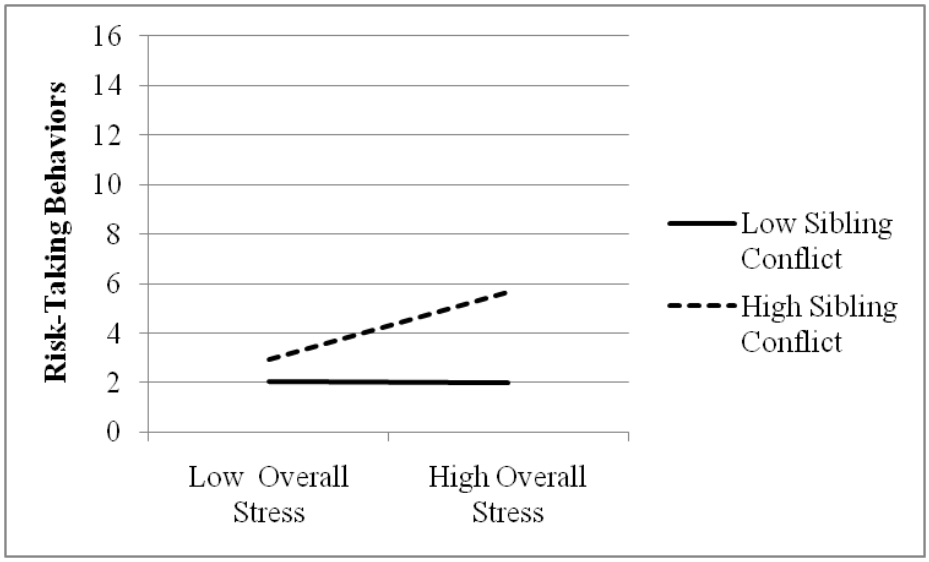

Figure 3. Interaction of sibling conflict and youth-reported overall stress in predicting risk-taking behaviors

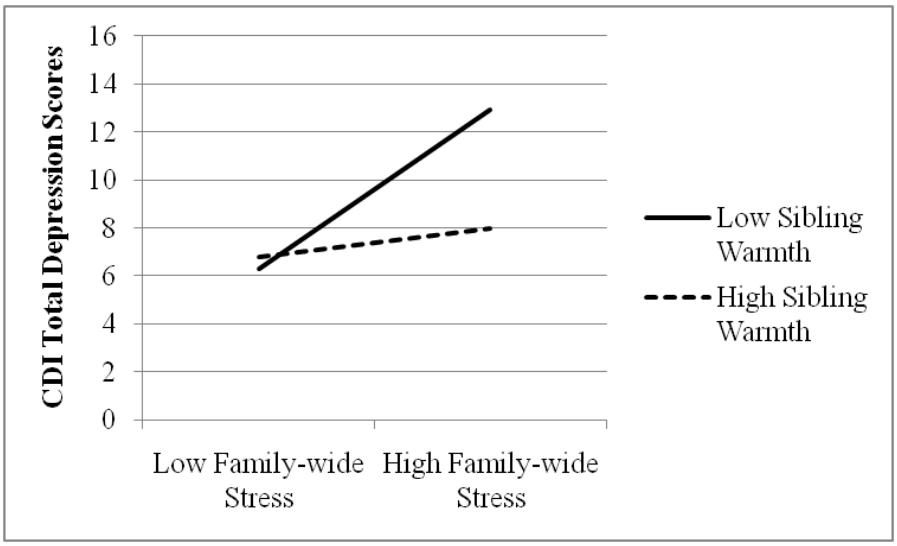

Figure 4. Interaction of sibling warmth and youth-reported family-wide stress in predicting depressive symptoms

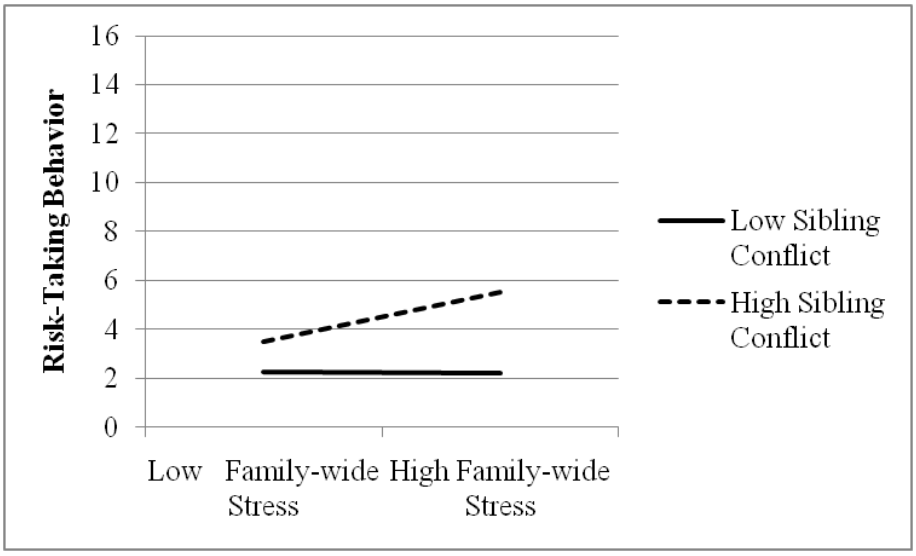

Figure 5. Interaction of sibling conflict and youth-reported family-wide stress in predicting risk-taking behaviors

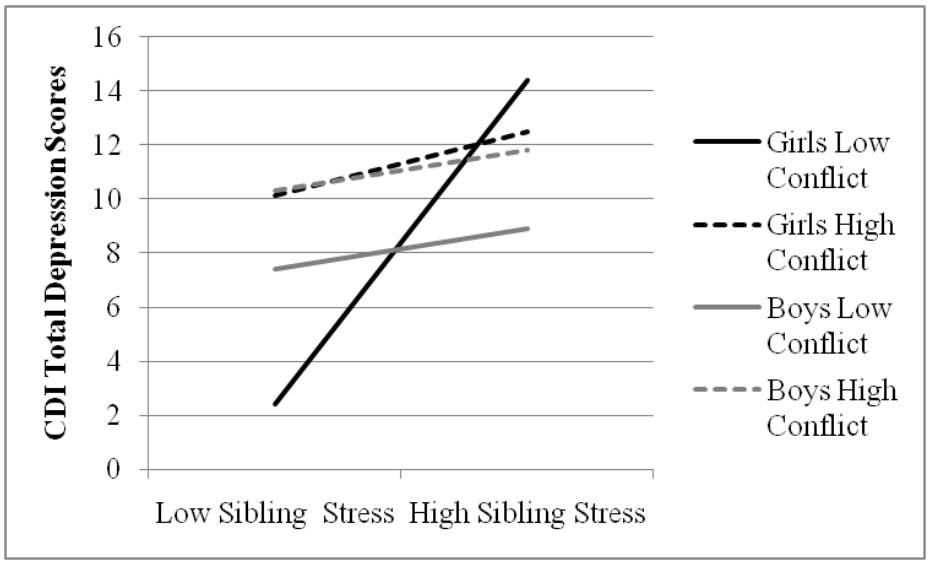

Figure 6. Interaction of sibling conflict, sex , and youth-reported sibling stress in predicting depressive symptoms